2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The Silicon Valley Power Pico Power Project (PPP) will be a 122-megawatt (MW) nominal net output, natural gas-fired, combined-cycle electrical generating facility, with the ability to peak-fire to 147 MW, connected to a 115-kilovolt (kV) switchyard. The PPP will be located on approximately 2.86 acres at 850 Duane Avenue in the City of Santa Clara, in Santa Clara County. A gas compressor station for the project will be located on the City of Santa Clara's maintenance yard, a 0.26-acre parcel at the corner of Lafayette and Comstock Streets in Santa Clara.

2.2 PPP DESCRIPTION, DESIGN, AND OPERATION

This section describes the design and operational characteristics of the proposed PPP plant.

2.2.1 Site Plan and Access

The site arrangement shown in Figure 2.2-1, the project plan shown in Figure 2.2-2a (power plant) and 2.2-2b (gas compressor station), and the typical elevation views shown in Figures 2.2-3a and 2.2-3b illustrate the location and size of the PPP. Approximately 2.86 enclosed acres will be required to accommodate the generation facilities, control/administration building, switchyard, emission control equipment, storage tanks, and parking area. A gas compressor station (Figure 2.2-2b) will be located across Lafayette Street from the power plant, on City of Santa Clara property at the corner of Lafayette and Comstock streets.

Access to the PPP will be from an existing entrance driveway on Duane Avenue. Most of the surface within the enclosed area will be graveled. A paved driveway will run around the perimeter of the power block, connecting with the SVP Kifer Receiving Station. Access to the compressor station will be through the existing City of Santa Clara maintenance yard through gates on Lafayette Street and Comstock Street.

The project site is located in Township 6S, Range 1W, Section 26 or 27 (the United States Geological Survey (USGS) Milpitas 7.5-minute topographic quadrangle does not depict a boundary between sections 26 and 27). Because of the project's proximity to a Mexican-era land grant, sections in this location have irregularly shaped boundaries and it is not meaningful to describe the location in terms of township, range, and section. The listed and mapped assessor's parcel numbers of the power plant site are 224-08-140 and 224-36-047. In reality, however, there are several parcels underlying the power plant and compressor station sites. The City of Santa Clara owns all of these parcels, and the City is currently working to consolidate them into two or three separate parcels through lot line adjustment, which will be completed during the fourth quarter of 2002. The parcel number of the gas compressor station site is 224-36-014. See Section 8.6, Land Use, for further information.

2.2.2 Process Description

The PPP power train will consist of: 1) two LM6000PC Sprint combustion turbine generators (CTGs), equipped with water injection to control NO_x and air inlet chilling; 2) two heat recovery steam generators (HRSGs) with duct burners; 3) selective catalytic reduction (SCR) and CO Catalyst equipment to control emissions; 4) a single condensing steam turbine generator (STG); 5) a deaerating surface condenser; 6) a mechanical draft, plume-abated cooling tower; and 7) associated support equipment.

Each CTG will generate a maximum 50 MW. The CTG exhaust gases will be used to generate steam in the HRSGs. The HRSGs will employ a two steam-pressure design with duct firing equipment. Steam from the HRSGs will be admitted to a condensing STG. A maximum of 57 MW will be produced by the steam turbine. The project is expected to have an overall annual availability of approximately 94 to 96 percent.

The heat balance for the power plant's baseload operation is shown in Figure 2.2-4a. This balance is based on an ambient temperature of 94°F with chilling of the combustion turbine inlet air to 48°F, and without the use of duct firing. The predicted net electrical output of this facility under these conditions is 122 MW. The heat balance for power plant peaking operation is shown in Figure 2.2-4b. This balance is based on an ambient temperature of 94°F with inlet chilling of the air and full duct firing. The predicted new electrical output of this facility under these conditions is 147 MW.

Associated equipment will include emission control systems necessary to meet the proposed emission limits. NO_x emissions will be controlled to a maximum of 2.5 (3-hour average) parts per million by volume, dry basis (ppmvd), corrected to 15 percent oxygen, by a combination of water-injected combustors in the CTGs and SCR systems in the HRSGs. Carbon monoxide will be controlled to a maximum of 4 ppmvd at 15 percent oxygen under all operating conditions, by means of a CO catalyst.

2.2.3 Power Plant Cycle

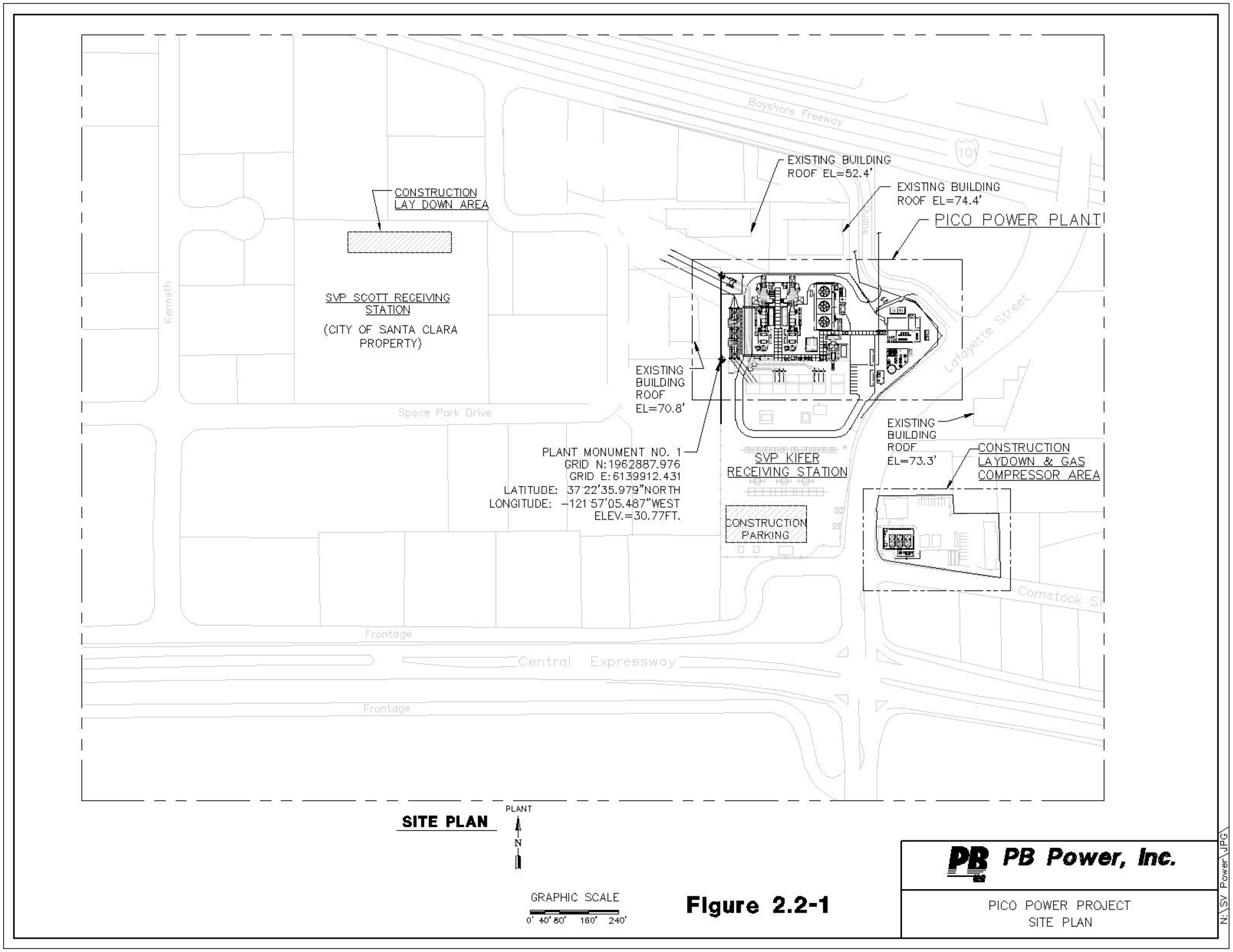
CTG combustion air will flow through the inlet air filters, cooling/heating coils, and associated air inlet ductwork, be compressed in the compressor section, and then enter the CTG combustion section. Natural gas fuel will be injected into the compressed air in the combustion sections and ignited. The hot combustion gases will expand through the power turbine section of the CTGs, causing them to rotate and drive both the electric generators and CTG compressors. The hot combustion gases will exit the turbine sections and enter the HRSGs, where they will heat water (feedwater) that is pumped into the HRSGs. The feedwater will be converted to superheated steam and delivered to the steam turbine at two pressures: high-pressure (HP), and low pressure (LP). The use of multiple steam delivery pressures will permit an increase in cycle efficiency and flexibility. High-pressure steam will be delivered to the HP section of the steam turbine and LP steam will be injected at the beginning of the LP section of the steam turbine and both flows will be expanded in the LP steam turbine section. Steam leaving the LP section of the steam turbine will enter the deaerating surface condenser and transfer heat to circulating cooling water, which will cause the steam to condense to water. The condensed water, or condensate, will be delivered to the HRSG feedwater system. The condenser cooling water will circulate through a wet, mechanical draft cooling tower where the heat absorbed in the condenser will be rejected to the atmosphere through evaporative cooling of the circulating water.

2.2.4 Combustion Turbine-Generators, Heat Recovery Steam Generators, Steam Turbine-Generator, and Condenser

The following paragraphs describe the major components of the generating facility.

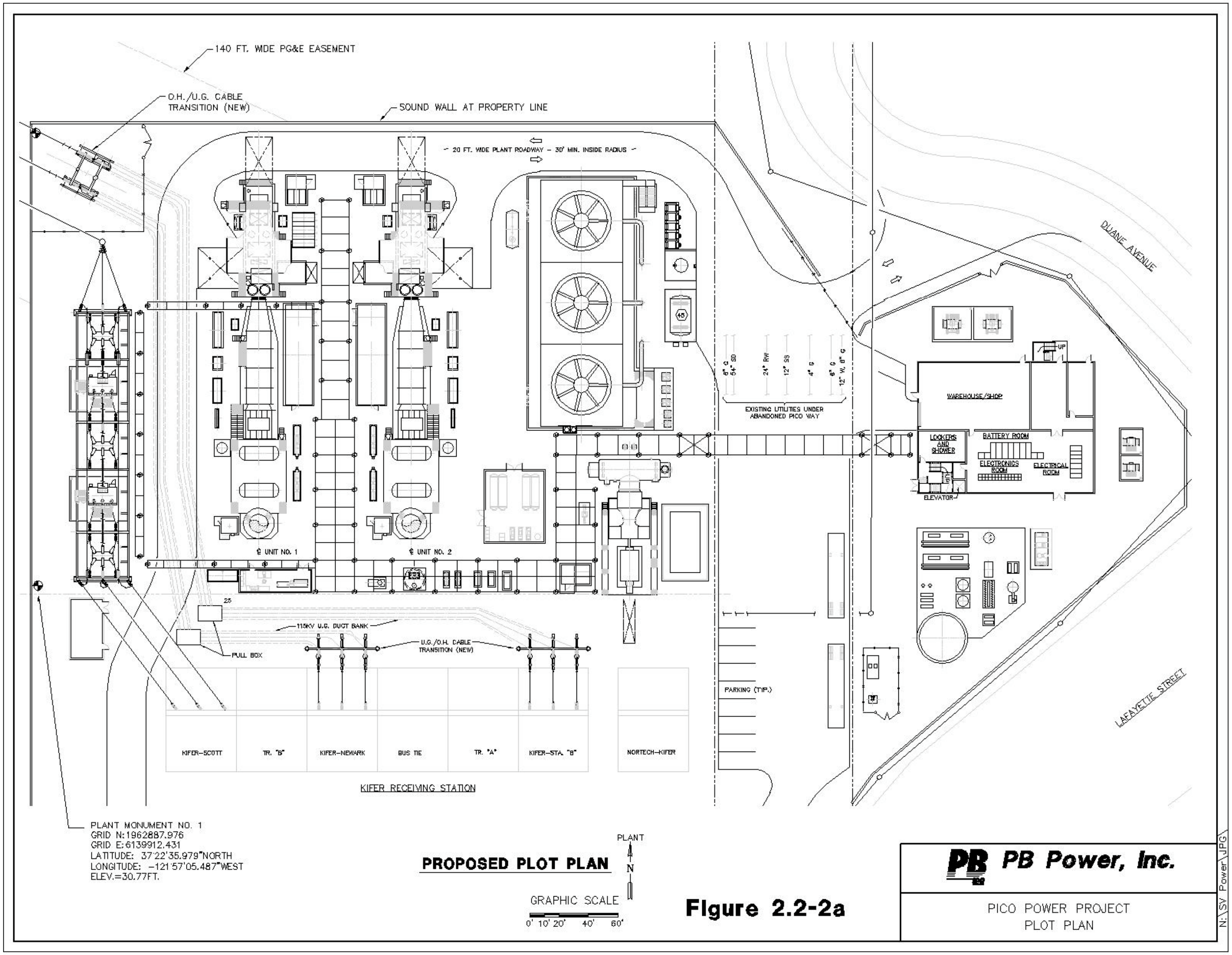
2.2.4.1 Combustion Turbine Generators

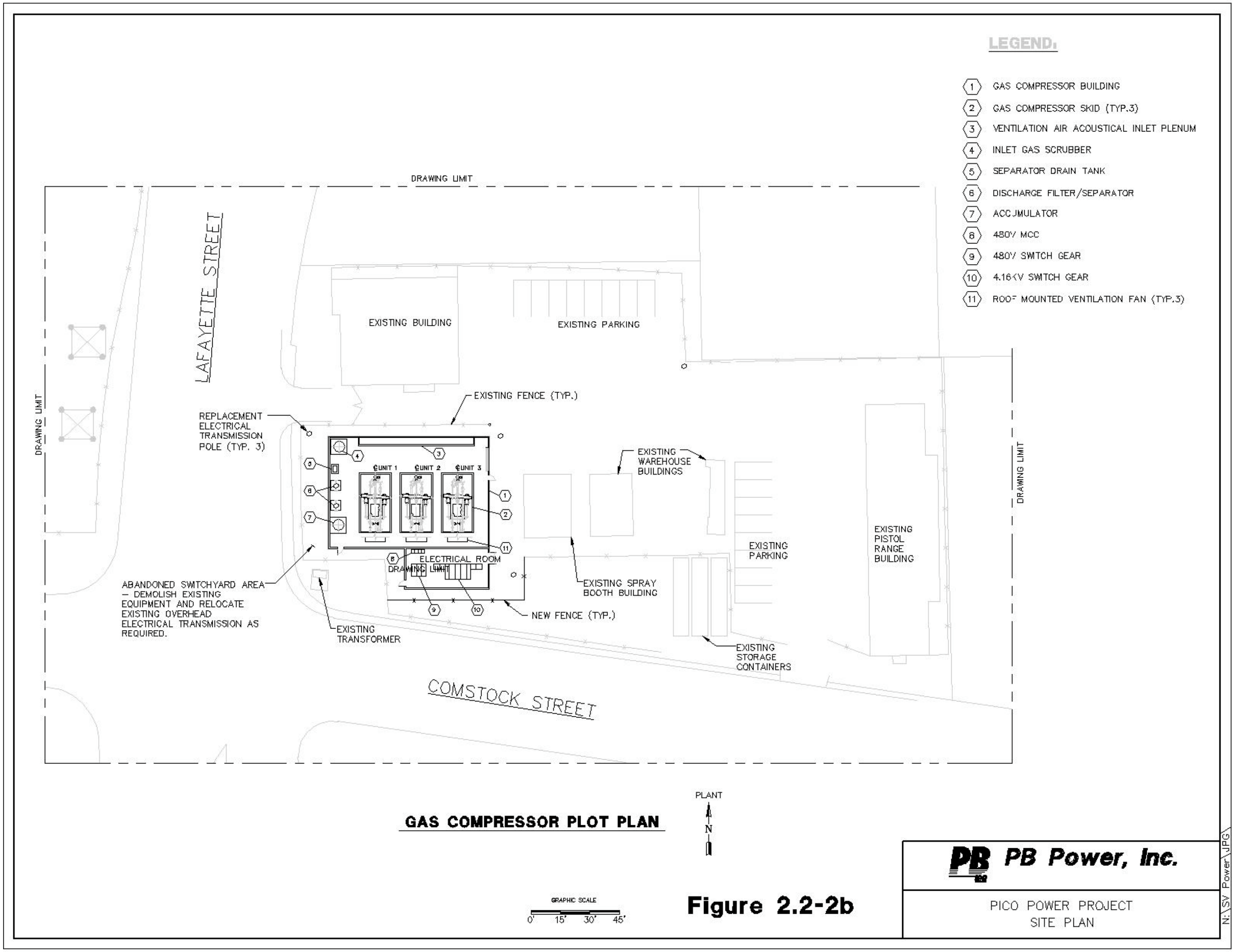
Thermal energy will be produced in the CTGs through the combustion of natural gas, which will be converted into mechanical energy required to drive the combustion turbine compressors and electric generators. Each CTG system will consist of a CTG with supporting systems and associated auxiliary



Bayshore Freeway
101
EXISTING BUILDING
ROOF EL=52.4'
EXISTING BUILDING
ROOF EL=74.4'
PICO POWER PLANT
CONSTRUCTION
LAY DOWN AREA
Kenneth
SVP SCOTT RECEIVING
STATION
(CITY OF SANTA CLARA
PROPERTY)
Lafayette Street
EXISTING
BUILDING
ROOF
EL=70.8'
Space Park Drive
EXISTING
BUILDING
ROOF
EL=73.3'
PLANT MONUMENT NO. 1
GRID N:1962887.976
GRID E:6139912.431
LATITUDE: 37°22'35.979"NORTH
LONGITUDE: -121°57'05.487"WEST
ELEV.=30.77FT.
SVP KIFER
RECEIVING STATION
CONSTRUCTION
LAYDOWN & GAS
COMPRESSOR AREA
CONSTRUCTION
PARKING
Comstock St
Frontage
Central Expressway
Frontage
SITE PLAN
PLANT
N
GRAPHIC SCALE
0' 40' 80' 160' 240'
PB Power, Inc.
PICO POWER PROJECT
SITE PLAN
N:\SV Power.JPG

Figure 2.2-1


140 FT. WIDE PG&E EASEMENT
O.H./U.G. CABLE TRANSITION (NEW)
SOUND WALL AT PROPERTY LINE
20 FT. WIDE PLANT ROADWAY - 30' MIN. INSIDE RADIUS
DUANE AVENUE
WAREHOUSE/SHOP
LOCKERS AND SHOWER
BATTERY ROOM
ELECTRONICS ROOM
ELECTRICAL ROOM
ELEVATOR
EXISTING UTILITIES UNDER ABANDONED PICO WAY
℄ UNIT NO. 1
℄ UNIT NO. 2
115KV U.G. DUCT BANK
PULL BOX
U.G./O.H. CABLE TRANSITION (NEW)
PARKING (TYP.)
LAFAYETTE STREET
KIFER-SCOTT
TR. "B"
KIFER-NEWARK
BUS TIE
TR. "A"
KIFER-STA. "B"
NORTECH-KIFER
KIFER RECEIVING STATION
PLANT MONUMENT NO. 1
GRID N:1962887.976
GRID E:6139912.431
LATITUDE: 37°22'35.979"NORTH
LONGITUDE: -121°57'05.487"WEST
ELEV.=30.77FT.
PROPOSED PLOT PLAN
PLANT N
GRAPHIC SCALE
0' 10' 20' 40' 60'
Figure 2.2-2a
PB Power, Inc.
PICO POWER PROJECT
PLOT PLAN
N:\SV Power\JPG



LEGEND:
1 GAS COMPRESSOR BUILDING
2 GAS COMPRESSOR SKID (TYP.3)
3 VENTILATION AIR ACOUSTICAL INLET PLENUM
4 INLET GAS SCRUBBER
5 SEPARATOR DRAIN TANK
6 DISCHARGE FILTER/SEPARATOR
7 ACCUMULATOR
8 480V MCC
9 480V SWITCH GEAR
10 4.16KV SWITCH GEAR
11 ROOF MOUNTED VENTILATION FAN (TYP.3)
DRAWING LIMIT
LAFAYETTE STREET
EXISTING BUILDING
EXISTING PARKING
EXISTING FENCE (TYP.)
REPLACEMENT ELECTRICAL TRANSMISSION POLE (TYP. 3)
UNIT 1
UNIT 2
UNIT 3
EXISTING WAREHOUSE BUILDINGS
EXISTING PARKING
EXISTING PISTOL RANGE BUILDING
ELECTRICAL ROOM
ABANDONED SWITCHYARD AREA — DEMOLISH EXISTING EQUIPMENT AND RELOCATE EXISTING OVERHEAD ELECTRICAL TRANSMISSION AS REQUIRED.
EXISTING SPRAY BOOTH BUILDING
NEW FENCE (TYP.)
EXISTING TRANSFORMER
EXISTING STORAGE CONTAINERS
COMSTOCK STREET
GAS COMPRESSOR PLOT PLAN
PLANT
N
GRAPHIC SCALE
0' 15' 30' 45'
PB Power, Inc.
PICO POWER PROJECT
SITE PLAN
N:\SV Power\JPG\

Figure 2.2-2b

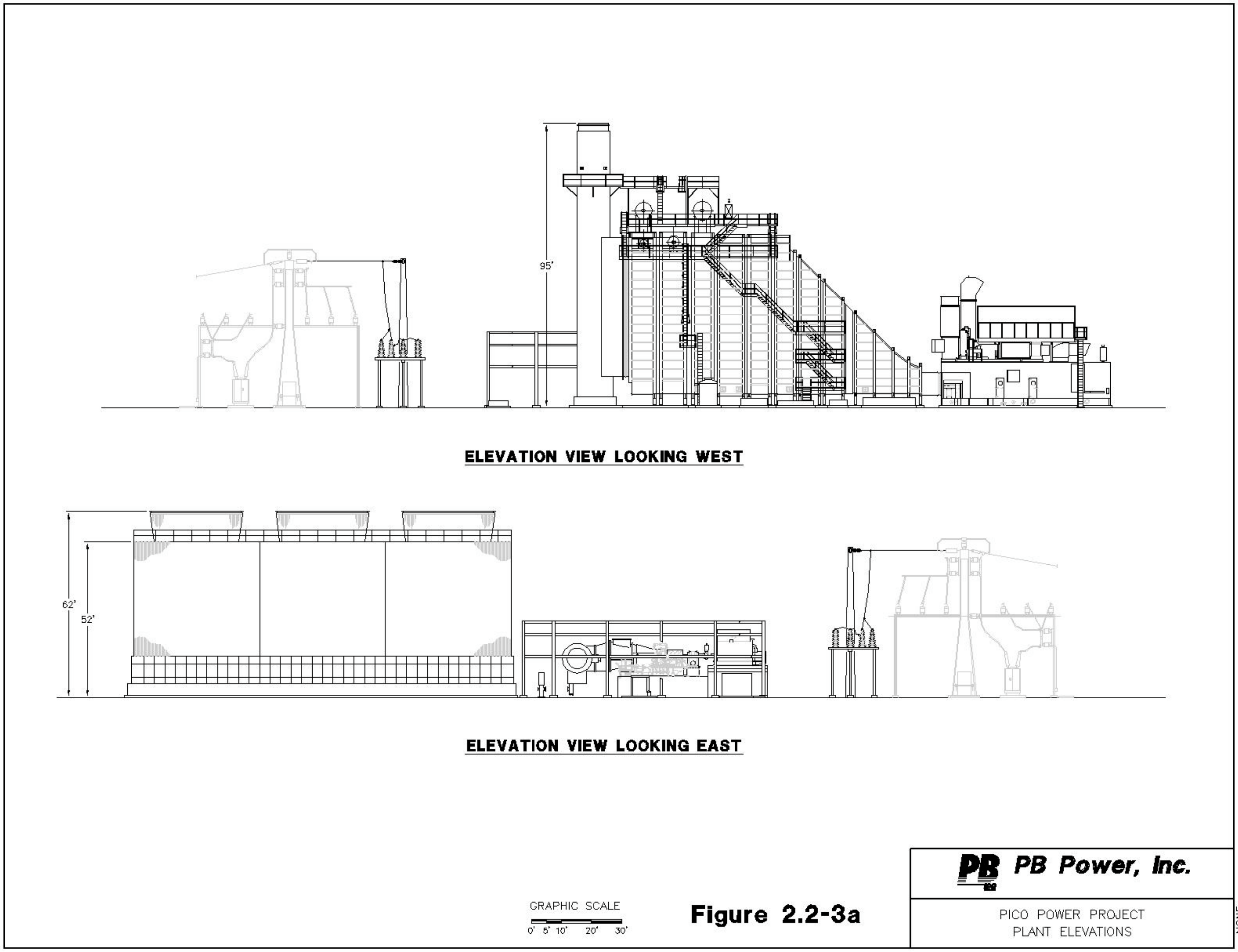
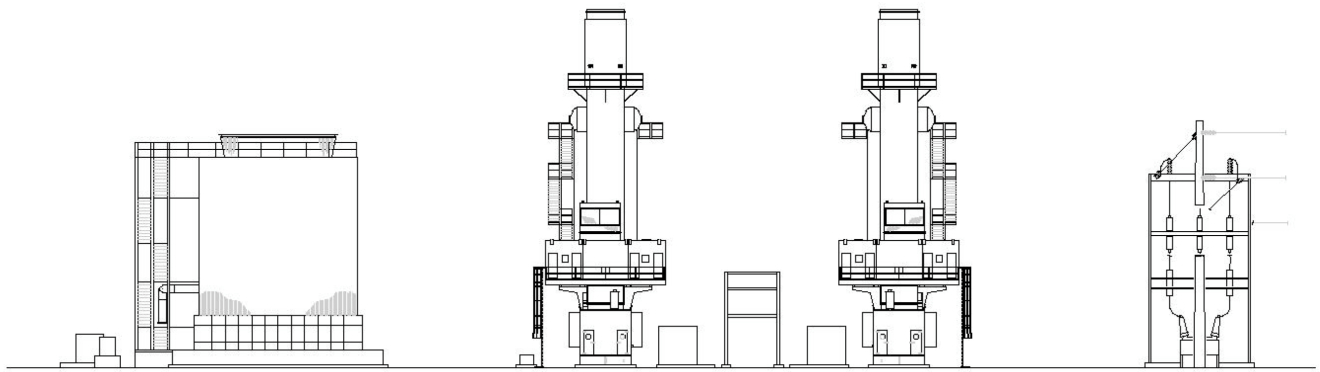

95'
ELEVATION VIEW LOOKING WEST
62'
52'
ELEVATION VIEW LOOKING EAST
GRAPHIC SCALE
0' 5' 10' 20' 30'
PB Power, Inc.
PICO POWER PROJECT
PLANT ELEVATIONS
NONE

Figure 2.2-3a



ELEVATION VIEW LOOKING SOUTH

GRAPHIC SCALE
0' 5' 10' 20' 30'

Figure 2.2-3b

PB Power, Inc.

PICO POWER PROJECT
PLANT ELEVATION

NONE

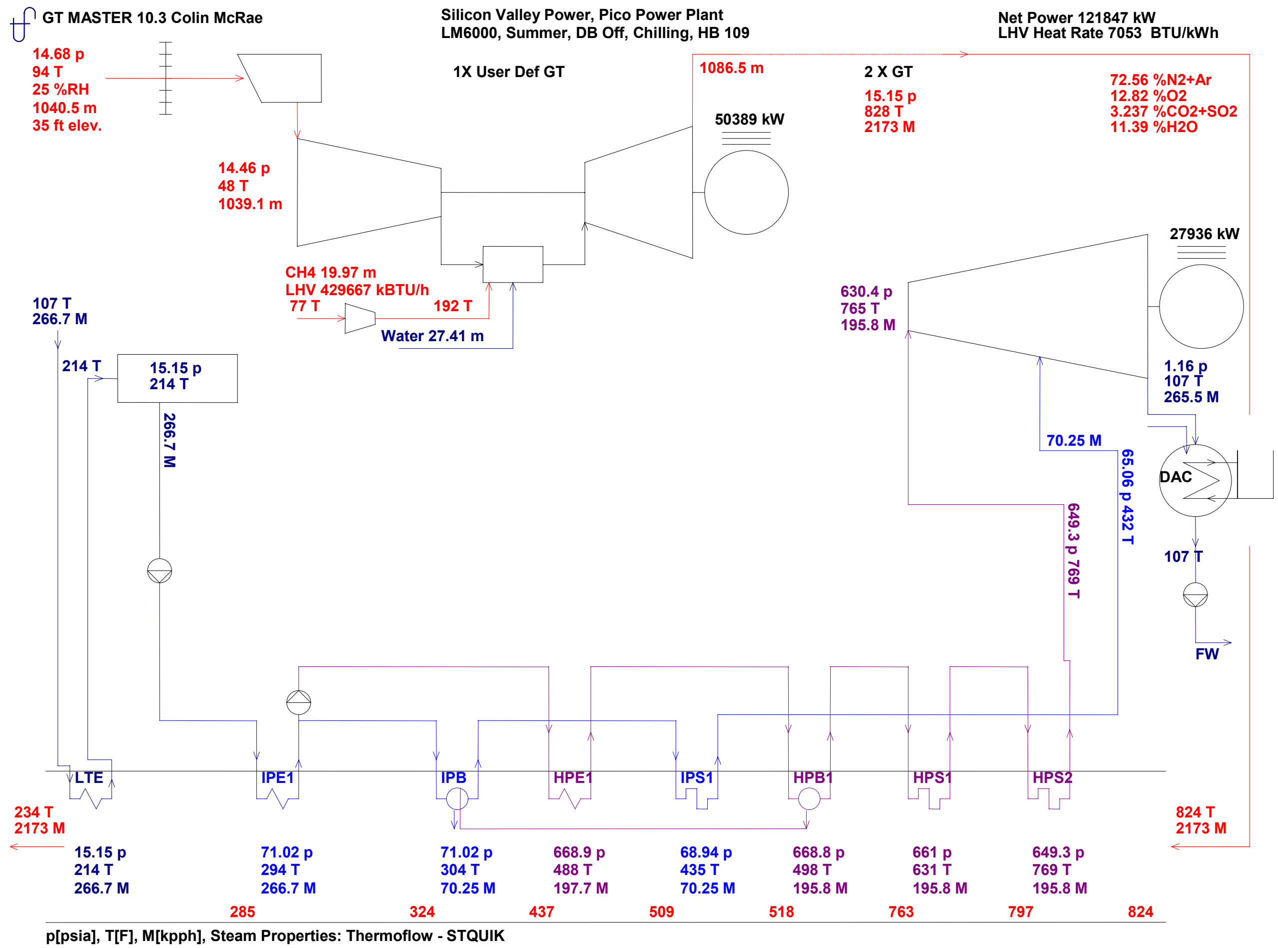


Figure 2.2-4a. Heat Balance, Baseload Operation

PB Power

PICO POWER PROJECT
HEAT BALANCE

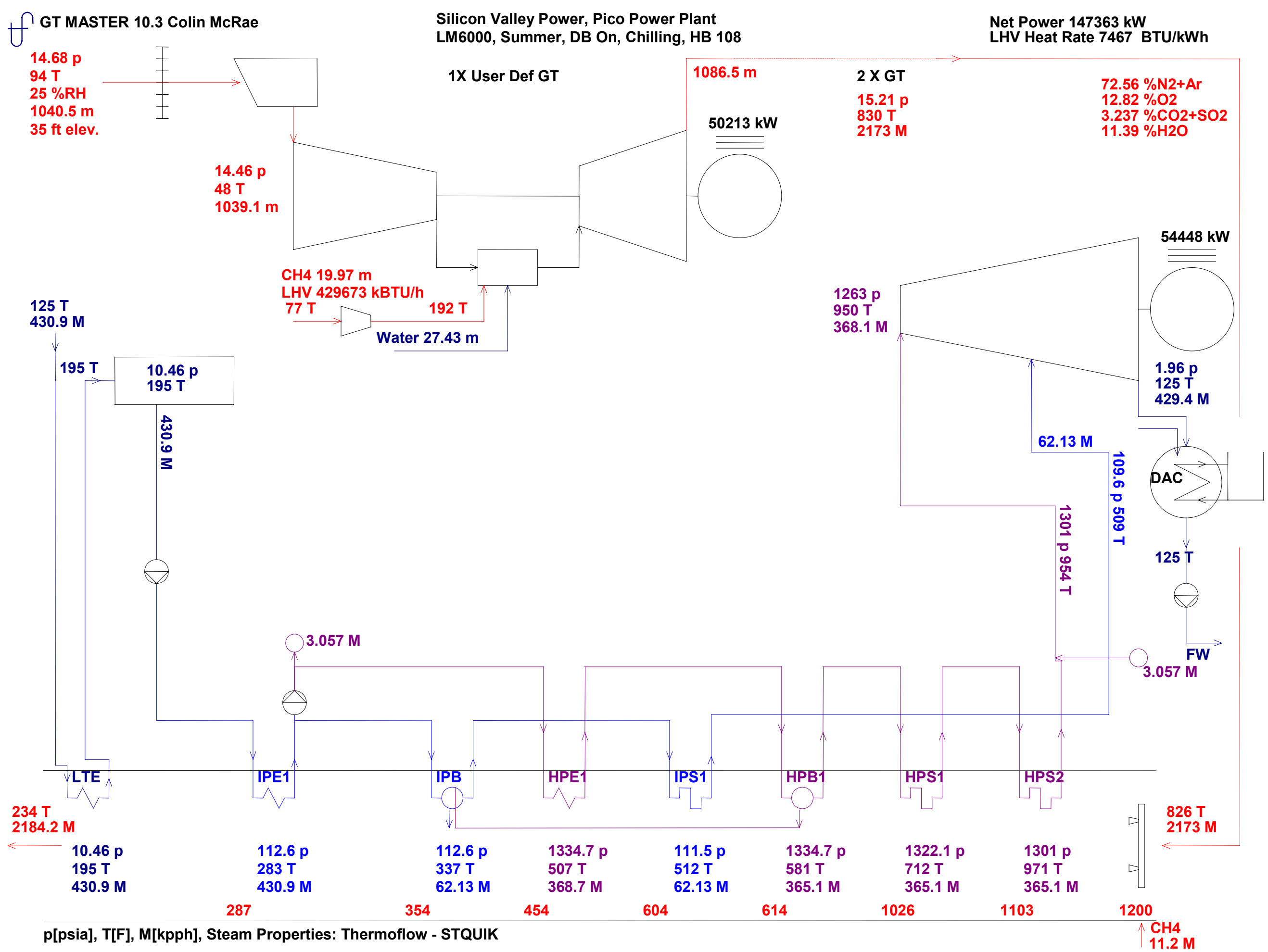


Figure 2.2-4b. Heat Balance, Peaking Operation

PB Power

PICO POWER PROJECT
HEAT BALANCE

equipment. The CTGs will have water injection into the low pressure compressor, into the high pressure compressor, and into the combustors to increase power and lower NO_x emissions.

The CTGs will be equipped with the following required accessories to provide safe and reliable operation:

- Inlet air chilling/heating system
- Inlet air filters
- Metal acoustical enclosure
- Two lube oil systems, one for the combustion turbine and one for the generator
- Water injected low NO_x combustion system
- Sprint Power Boost System
- Compressor wash system-both online and offline
- Fire detection and protection system (utilizing carbon dioxide)
- Fuel gas system, including flow meter, strainer, and duplex filter
- Starter System
- Turbine controls
- Direct-air-cooled synchronous generators
- Generator controls, protection, excitation, power system stabilizer, and automatic generation control (AGC)

The CTGs and accessory equipment will be contained in a metal acoustical enclosure.

2.2.4.2 Heat Recovery Steam Generators

The HRSGs will transfer heat from the exhaust gases of the CTGs to the feedwater, which will become steam. The HRSGs will be two-pressure, natural circulation units equipped with inlet and outlet ductwork, duct burners, insulation, lagging, and separate exhaust stacks.

Major heat transfer components of each HRSG will include an LP economizer, LP evaporator, LP drum, LP superheater, HP economizer, HP evaporator, HP drum, and HP superheaters. The LP economizer will receive condensate from the condenser hot well via the condensate pumps. The LP economizer will be the final heat transfer section to receive heat from the combustion gases before they are exhausted to the atmosphere.

Condensate will be directed through the LP economizer then split between the HP boiler feed pumps and the LP drum. The boiler HP feed pumps will provide additional pressure to serve the HP sections of the HRSG. Similarly, as described above, the LP and HP steam will be produced for supply to the steam turbine.

Feedwater from the LP economizer which is pumped by the HP boiler feed pumps will be sent to the HP section of the HRSG. High-pressure feedwater will flow through the HP economizers to the HP steam drum, where a saturated liquid state will be maintained. Next, the saturated water will flow from the steam drum through downcomers to the inlet headers of the HP evaporator. The saturated water will flow upward through the HP evaporator tubes by natural circulation. Saturated steam will form in the tubes while energy from the combustion turbine exhaust gas is absorbed. The HP-saturated liquid/vapor mixture will then return to the steam drum, where the two phases will be separated by the steam separators in the drum. The saturated water will return to the HP evaporator while the vapor passes to the HP superheater inlet. The saturated steam (vapor) will pass through the HP superheater to the HP steam turbine entrance.

Feedwater from the LP economizer will also be sent to the LP section of the HRSG. This LP feedwater will flow to the LP steam drum where a saturated liquid state will be maintained. Next, the saturated water will flow from the steam drum through downcomers to the inlet headers of the LP evaporator. The saturated water will flow upward through the LP evaporator tubes by natural circulation. Saturated steam will form in the tubes as energy from the combustion turbine exhaust gas is absorbed. The LP-saturated liquid/vapor mixture will then return to the steam drum where the two phases will be separated. The saturated water will return to the LP evaporator, while the vapor passes to the LP superheater inlet. The saturated steam (vapor) will pass through the LP superheater to the LP steam turbine entrance.

Duct burners will be installed in the HRSGs. These burners will provide the capability to increase steam generation, increase operating flexibility, and improve steam temperature control. The duct burners will burn natural gas. The duct burner for each HRSG will be sized to release up to 136.9 million British thermal units (mmBtu higher heating value or HHV basis) per hour per HRSG.

The HRSGs will be equipped with an SCR emission control system that will use ammonia vapor in the presence of a catalyst to reduce the NO_x concentration in the exhaust gases. The catalyst module will be located in the HRSG casing. Diluted ammonia vapor (NH_3) will be injected into the exhaust gas stream through a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction will reduce NO_x to nitrogen and water, reducing the NO_x concentration of no more than 2.5 (annual average basis) ppmvd at 15 percent oxygen (O_2) in the HRSG exhaust gas. A CO catalyst will control CO emissions to 4.0 ppm (annual average).

2.2.4.3 Steam Turbine System

The steam turbine system will consist of a condensing steam turbine, gland steam system, lubricating oil system, hydraulic control system, and steam admission/induction valving. The steam turbine will drive a Totally Enclosed Water/Air-Cooled (TEWAC) synchronous generator.

Steam from the HRSG HP and LP superheaters will enter the respective steam turbine sections through the inlet steam system. The steam will expand through the turbine blading, driving the generator. On exiting the turbine, the remaining steam will flow into the condenser.

2.2.5 Major Electrical Equipment and Systems

The electric power produced by the facility will be transmitted to the Silicon Valley Power grid. Some power will be used on-site to power auxiliaries such as gas compressors, pumps and fans, control systems, and general facility loads, including lighting, heating, and air conditioning. Some will also be converted from alternating current (AC) to direct current (DC) for use as backup power for control systems and for other uses. Transmission and auxiliary uses are discussed in the following subsections.

2.2.5.1 AC Power Transmission

Power will be generated by the two CTGs at 13.8 kV, and one STG at 13.8 kV. An overall single-line diagram of the facility's electrical system is shown in Figure 6.2-1. The generator output will be connected by cable bus to two oil-filled, three winding generator step-up transformers, which will increase the voltage to 115 kV. Surge arresters will be provided at the high-voltage bushings to protect the transformers from surges on the 115 kV system caused by lightning strikes or other system disturbances. The transformers will be set on concrete pads within containments, which will contain the transformer oil in the event of a leak or spill. The high voltage side of each step-up transformer will be connected to the SVP Scott to Kifer line via a three-breaker arrangement at the plant's on-site 115 kV switchyard. From the switchyard, power will be transmitted through the Scott and Kifer 115 kV Receiving Stations, both owned and operated by Silicon Valley Power.

2.2.5.2 AC Power Distribution to Auxiliaries

The facility will have two sources of power for the auxiliary system. Auxiliary power to the combustion turbine and steam turbine power block will be supplied by a 4160- and 480-volt AC switchgear lineup. Power to the switchgear will be supplied by one oil-filled 13.8 to 4.16 kV Station Auxiliary Transformers, or, upon loss of the 115 kV transmission system, by one 12 kV to 4.16 kV Station Service Transformer fed from an off-site 12 kV source. The high voltage sides (13.8 kV) of the Auxiliary Transformers will be connected to one of the CTGs. Normally, these connections will allow the switchgear to receive power generated by the connected CTG or by back feeding power from the 115 kV switchyard via the connected CTG's step-up transformer. The plant design will provide for starting up the plant from the off-site 12 kV source should the 115 kV system become unavailable. Once the plant is on line, operating in the islanded mode with the SVP transmission system, the plant's auxiliary system will be transferred to the Station Auxiliary Transformer (normal source) via fast transfer, supervised by a power transfer relay.

The 4,160-volt switchgear lineup will supply power to the various 4,000-volt motors and to the load center (LC) transformers rated 4160 to 480 volts for 480-volt power distribution. The switchgear will have vacuum breakers for the main incoming feeds and for power distribution, and fused contactors for motor feeds.

The LC transformers will be of the dry type if located inside and will be of the oil-filled type if located outside. Each transformer will supply 480-volt, three-phase power to LC switchgear. The LC switchgear will provide power through feeder breakers to the various 480-volt motor control centers (MCCs). The MCCs will distribute power to 480-volt motors, to 480-volt power panels, and to other intermediate 480-volt loads. The MCCs will distribute power to 480-480/240-volt isolation transformers when 277-volt, single-phase lighting loads are to be served. The 480-volt power panels will distribute power to small 480-volt loads.

Power for the AC power supply (120-volt/208-volt) system will be provided by the 480-volt MCCs and 480-volt power panels. Transformation of 480-volt power to 120/208-volt power will be provided by 480-120/208-volt dry-type transformers.

2.2.5.3 DC Power Supply

One common DC power supply system consisting of one 120-volt DC battery, two 100 percent 125-volt DC full-capacity battery chargers, metering, ground detectors, and distribution panels will be supplied for balance-of-plant and steam turbine equipment.

Under normal operating conditions, the battery chargers will supply DC power to the DC loads. The battery chargers will receive 480-volt, three-phase AC power from the AC power supply (480-volt) system and continuously charge the battery. The ground detection scheme will detect grounds on the DC power supply system.

Under abnormal or emergency conditions, when power from the AC power supply (480-volt) system is unavailable, the battery itself, rather than the charger, will provide DC power for the DC system loads. Recharging of a discharged battery will occur whenever 480-volt power becomes available from the AC power supply (480-volt) system. The rate of charge will depend on the characteristics of the battery, battery charger, and connected DC load during charging. The anticipated maximum recharge time will be 24 hours.

The 120-volt DC system will also be used to provide control power to the 480-volt switchgear, to the 480-volt LCs, to critical control circuits, and to the emergency DC motors.

2.2.5.4 Essential Service AC Uninterruptible Power Supply (UPS)

The combustion turbines and steam turbine power block will also have an essential service 120-volt AC, single-phase, 60 Hz power source. This source will supply AC power to essential instrumentation, to critical equipment loads, and to unit protection and safety systems that require uninterruptible AC power. The essential service AC system and DC power supply system will be designed to ensure that critical safety and unit protection control circuits have power and can take the correct action on a unit trip or loss of plant AC power.

The essential service AC system will consist of one full-capacity inverter, a solid-state transfer switch, a manual bypass switch, an alternate source transformer and-voltage regulator, and an AC panelboard.

The normal source of power to the system will be the DC power supply system through the inverter to the panelboard. A solid-state static transfer switch will monitor the inverter output and the alternate AC source continuously. The transfer switch will automatically transfer essential AC loads without interruption from the inverter output to the alternate source upon loss of the inverter output.

A manual bypass switch will also be included to enable isolation of the inverter-static transfer switch for testing and maintenance without interruption to the essential service AC loads.

2.2.6 Fuel System

The CTGs will be designed to burn natural gas. Maximum natural gas requirements during base load operation, with no duct firing, are approximately 22,800 mmBtu/day, higher heating value (HHV) basis. Operating to the limit of the air permit, PPP will consume approximately 8,411,000 mmBtu per year.

The pressure of natural gas delivered to the site via a 2.0-mile pipeline (see Section 5) is expected be approximately 250 to 375 pounds per square inch gauge (psig). The natural gas will flow through an inlet filter and then be pressurized by compressors located in a building off site across Layafette Street at the corner of Comstock Street, as needed. The gas will then flow through gas scrubber/filtering equipment, a gas pressure control station, and unit flow metering stations before entering the combustion turbines. LP gas for the HRSG duct burner systems, and building heating systems will be provided by a central pressure reduction station and an LP gas distribution system.

2.2.7 Water Supply and Use

The cities of Santa Clara and San Jose will provide the industrial process water supply for the PPP through the South Bay Water Recycling Program. The cities will supply reclaimed tertiary treated water to meet cooling and process makeup requirements. A "will-serve" letter from the cities that describes their commitment of water supply to the project is included in Appendix 7-A.

The City of Santa Clara will provide potable water for emergency backup use. Due to water conveyance constraints in the City's potable water distribution system, the City has recommended that the PPP install a City-owned well on the project site. When and if the recycled water supply is interrupted, this well would supplement the existing pipeline to supply the project with backup water. When not needed for the project, the well would function as one of the City's supply wells. Sufficient groundwater resources are available to support this additional City well, partly due to the City's active groundwater recharge program (See Section 8.15, Water Resources).

Interruption of recycled water supply is less likely at the PPP than at other locations that are further from the waste water treatment plant. In addition, the South Bay Water Recycling Program has demonstrated a high degree of reliability in delivering recycled water over the past several years. It is therefore unlikely that recycled water would be interrupted in a normal year so that the project would require potable water for process use. Chapter 7 describes the project water supply and water quality in greater detail, and includes a water balance diagram (Figure 7-1).

Water required for domestic uses and fire fighting will also be provided by the City of Santa Clara. A new connection would be made to the existing 12-inch potable water line that runs on site in the former PicoWay. The City of Santa Clara's water supply comes from City wells and the Hetch Hetchy aqueduct.

2.2.7.1 Water Quality

An analysis of the water sources is provided in Section 7, Water Supply.

2.2.7.2 Water Treatment

Tertiary effluent is suitable for use as process water and cooling water without filtration and disinfection.

2.2.8 Plant Cooling Systems

The steam turbine cycle heat rejection system will consist of a deaerating steam surface condenser, cooling tower, and cooling water (circulating water) system. The heat rejection system will receive exhaust steam from the low-pressure steam turbine and condense it to water (condensate) for reuse. A surface condenser is a shell and tube heat exchanger; the steam condenses on the shell side, and the cooling water flows through the tubes, making one or more passes. The condenser will be designed to operate at a pressure of approximately 4.0 inches of mercury, absolute (in. HgA) at an ambient temperature of 94°F. It will transfer approximately 390 mmBtu/hr from condensing steam to cooling water. Approximately 25,000 gallons per minute (gpm) of circulating cooling water is required to condense the turbine exhaust steam at maximum plant load at 94°F, ambient temperature. An additional 10,000 gpm of circulating water will be used for the auxiliary cooling load.

The cooling water will circulate through a counter-flow mechanical draft cooling tower that uses electric motor-driven fans to move air in a direction opposite to the flow of the cascading water. The heat removed in the condenser will be discharged to the atmosphere by heating the air and evaporating some of the cooling water. High efficiency drift (the fine mist of water droplets entrained in the warm air leaving the cooling tower) eliminators will reduce drift to 0.0005 percent of the circulating water flow.

2.2.9 Waste Management

All wastes produced at the PPP plant will be properly collected, treated if necessary, and disposed. Wastes will include waste water, solid nonhazardous waste, and hazardous waste (liquid and solid). Waste management is discussed in more detail in Section 8.14.

2.2.9.1 Waste Water Collection, Treatment, and Disposal

Expected waste water streams (excluding sanitary waste water) and flow rates for the PPP are shown on the water balance flow schematic, Figure 7-1 in Section 7. The average flow rates shown are based on 61° F ambient temperature and the peak flow rates assume 94° F ambient temperature.

Waste water discharges from the plant include the following:

- Cooling tower and process blowdown (peak 385 gpm, average 182 gpm)
- Sanitary waste water (2 gpm)
- PPP plant drainage (peak 387 gpm, average 184 gpm)

Details of each of these waste streams are included in Section 7.

2.2.9.2 Solid Waste

The PPP will produce maintenance and plant wastes typical of power generation operations. Generation plant wastes include oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers. These materials will be collected by a waste collection company, such as Browning Ferris, Inc. (BFI), and transported to a material recovery facility (MRF), such as one owned by BFI located at the Newby Island Landfill in Milpitas. Recyclables will be removed, and the remaining residue will be deposited in a landfill such as the Newby Island Landfill (see Section 8.14, Waste Management). Waste collection and disposal will be in accordance with applicable regulatory requirements to minimize health and safety effects.

2.2.9.3 Hazardous Wastes

Several methods will be used to properly manage and dispose of hazardous wastes generated by the PPP. Waste lubricating oil will be recovered and recycled by a waste oil recycling contractor. Spent lubrication oil filters will be disposed of in a Class I landfill. Spent SCR catalyst will be recycled by the supplier or disposed of in a Class I landfill. Workers will be trained to handle any hazardous waste generated at the site.

Chemical cleaning wastes will consist of alkaline and acid cleaning solutions used during pre-operational chemical cleaning of the HRSGs, acid cleaning solutions used for chemical cleaning of the HRSGs after the units are put into service, and turbine wash and HRSG fireside wash waters. These wastes, which may have high metal concentrations, will be stored temporarily on-site in a portable tank. The tank will be emptied and the contents disposed of off-site by a licensed chemical cleaning contractor in accordance with applicable regulatory requirements.

2.2.10 Management of Hazardous Materials

Various chemicals will be stored and used during the construction and operation of the PPP. All chemicals will be stored, handled, and used in accordance with applicable laws, ordinances, regulations, and standards (LORS). Chemicals will be stored in appropriate chemical storage facilities. Bulk chemicals will be stored in storage tanks, and other chemicals will be stored in returnable delivery containers. Chemical storage and chemical feed areas will be designed to contain leaks and spills. Berm design will allow a full-tank capacity spill without overflowing the berms. For multiple tanks located within the same bermed area, the capacity of the largest single tank will determine the volume of the bermed area. In the event of a spill, absorbent material or other appropriate handling methods will be used to remove the hazardous material and the collected material will be disposed by an appropriately authorized hazardous material handling company.

Aqueous ammonia will be stored in a horizontal tank mounted in a containment basin.

Safety showers and eyewashes will be provided adjacent to, or in the area of, all chemical storage and use areas. Hose connections will be provided near the chemical storage and feed areas to flush spills and leaks to the neutralization facility. State-approved personal protective equipment will be used by plant personnel during chemical spill containment and cleanup activities. Personnel will be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material will be stored on-site for spill cleanup. Electric equipment insulating materials will be specified to be free of polychlorinated biphenyls (PCBs).

A list of the chemicals anticipated for use at the power plant is provided in Section 8.5, Hazardous Materials Handling. This section identifies each chemical by type and intended use and estimates the quantity to be stored on-site. Section 8.14, Waste Management, includes additional information on hazardous waste handling. Section 8.12, Traffic and Transportation, contains information on the transport of hazardous materials.

2.2.11 Emission Control and Monitoring

Air emissions from the combustion of natural gas in the CTGs and duct burners will be controlled using state-of-the-art systems. Emissions that will be controlled include NO_x, reactive organic compounds (ROCs), CO, and particulate matter. Continuous emissions monitoring (CEM) will be employed in accordance with regulatory requirements. Section 8.1, Air Quality, includes additional information on emission control and monitoring.

2.2.11.1 NOx Emission Control

SCR will be used to control NO_x concentrations in the exhaust gas emitted to the atmosphere to an annual average of 2.5 ppmvd at 15 percent oxygen from the gas turbines (2.5 ppmvd at 15% oxygen, 3 hour average basis). The SCR process will use aqueous ammonia as the source of the ammonia vapor that will react with NO_x, in the exhaust gas to produce harmless N_2 and water. Ammonia slip, the unreacted ammonia in the exiting exhaust gas, will be limited to a concentration of 10 ppmvd at 15 percent oxygen. The SCR equipment will include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors.

2.2.11.2 CO and ROC Emission Control

The formation of CO and ROC will be controlled at the CTG combustor and HRSG duct burners by state-of-the-art combustion technology and a CO catalyst.

2.2.11.3 Particulate Emission Control

Particulate emissions will be controlled using combustion air filtration and use of natural gas, which is low in particulates, as the sole fuel for the CTGs and duct burners. Cooling tower drift elimination will control the emission of particulate matter from the cooling tower.

2.2.11.4 Continuous Emission Monitoring

CEM systems will record fuel gas flow rate and sample, analyze, and record the stack emission of NO_x, CO, and O_2 in the exhaust gas from each HRSG stack. This system will generate reports of emissions data in accordance with permit requirements and will send alarm signals to the plant distributed control and information system (DCIS) in the plant control room when the level of emissions approaches or exceeds pre-selected limits. Ammonia slip will be calculated in the CEMs Data Acquisition System from ammonia injected into the SCR, and turbine exhaust and stack NO_x CEM measurements.

2.2.12 Fire Protection

The fire protection system will be designed to protect personnel and limit property loss in the event of a fire. Water for fire fighting will be supplied from the City of Santa Clara's existing fire mains.

All fire hydrants and the fixed suppression systems will be supplied from the plant fire water loop. Fixed fire suppression systems will be installed at determined fire risk areas, such as the turbine lubrication oil equipment. Sprinkler systems will also be installed in the administration building and gas compressor building, as required by NFPA and local code requirements. The CTG units will be protected by a CO_2 fire protection system. Hand-held fire extinguishers of the appropriate size and rating will be located in accordance with NFPA 10 throughout the facility.

Section 8.5, Hazardous Materials Handling, includes additional information on fire and explosion risk, and Section 8.10, Socioeconomics, provides information on city and county fire protection capability.

2.2.13 Plant Auxiliaries

The following systems will support, protect, and control the generating facility.

2.2.13.1 Lighting

The lighting system will provide personnel with illumination for operation under normal conditions and for egress under emergency conditions. The system will include emergency lighting to perform manual operations during an outage of the normal power source. The system also will provide 120-volt convenience outlets for portable lamps and tools.

2.2.13.2 Grounding

The electrical system will be susceptible to ground faults, lightning, and switching surges that can result in high voltage, constituting a hazard to site personnel and electrical equipment. The station grounding system will provide an adequate path to permit the dissipation of current created by these events.

The station grounding grid will be designed for a capacity adequate to prevent overheating from ground current under the most severe conditions in areas of high ground fault current concentration. The grid spacing will be adequate to maintain safe voltage gradients. Bare conductors will be installed below grade in a grid pattern. Each junction of the grid will be bonded by an exothermal welding process or mechanical clamps.

Ground resistivity as determined as part of the final geotechnical study will be used to determine the necessary number of ground rods and grid spacings to ensure safe step and touch potentials under severe fault conditions. Grounding stingers ("pigtails") will be brought from the ground grid to connect to building steel and non-energized metallic parts of electrical equipment.

2.2.13.3 Distributed Control and Information System

The Distributed Control and Information System (DCIS) will provide modulating control, digital control, monitoring, and indicating functions for the plant power block systems. The following functions will be provided:

- Controlling the STG, CTGs, HRSGs, and other systems in a coordinated manner
- Controlling the balance-of-plant systems in response to plant demands
- Monitoring controlled plant equipment and process parameters and delivering this information to plant operators
- Providing control displays (printed logs, cathode ray tube [CRT]) for signals generated within the system or received from input/output (I/O)
- Providing consolidated plant process status information through displays presented in a timely and meaningful way
- Providing alarms for out-of-limit parameters or parameter trends, displaying on alarm CRT(s), and recording on an alarm log printer
- Storing and retrieving historical data

The DCIS will be a redundant microprocessor-based system consisting of the following major components:

- CRT-based operator consoles
- Engineer work station
- Distributed processing units
- I/O cabinets
- Historical data unit
- Printers
- Data links to the combustion turbine and steam turbine control systems

The DCIS will have a functionally distributed architecture comprising a group of similar redundant processing units; these units will be linked to a group of operator consoles and the engineer work station by redundant data highways. Each processor will be programmed to perform specific dedicated tasks for control information, data acquisition, annunciation, and historical purposes. Since they will be redundant, no single processor failure can cause or prevent a unit trip.

The DCIS will interface with the control systems furnished by the combustion turbine and steam turbine suppliers to provide remote control capabilities, as well as data acquisition, annunciation, and historical storage of turbine and generator operating information. The system will be designed with sufficient redundancy to preclude a single device failure from significantly affecting overall plant control and operation. This also will allow critical control and safety systems to have redundancy of controls and an uninterruptible power source.

As part of the quality control program, daily operator logs will be available for review to determine the status of the operating equipment.

2.2.13.4 Cathodic Protection

The cathodic protection system will be designed to control the electrochemical corrosion of designated metal piping buried in the soil. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection will be provided.

2.2.13.5 Freeze Protection

The freeze protection system will provide heat to protect various outdoor pipes, gauges, pressure switches, and other devices (as required) from freezing temperatures. Power to the freeze protection circuits will be controlled by an ambient thermostat.

2.2.13.6 Service Air

The service air system will supply compressed air to hose connections for general plant use. Service air headers will be routed to hose connections located at various points throughout the facility.

2.2.13.7 Instrument Air

The instrument air system will provide dry air to pneumatic operators and devices. An instrument air header will be routed to locations within the facility equipment areas and within the water treatment building where pneumatic operators and devices will be located.

2.2.14 Interconnect to Electrical Grid

The two CTGs will each be connected to a three winding, three-phase step-up transformer and the STG will be connected to either of the step-up transformers that will be connected to the 115 kV Kifer to Scott line at the plant switchyard. The switchyard will consist of a three breaker arrangement with airbreak disconnect switches and SF_6 circuit breakers. From the switchyard, the generated power will be transmitted into the Kifer and Scott Receiving stations. Refer to Section 6 for additional information on the switchyard and transmission line.

2.2.15 Project Construction

Construction of the PPP is planned to begin in June 2003 and require a total duration of 16 to 18 months. Major milestones are listed in Table 2.2-1.

Table 2.2-1. Project schedule major milestones.

Activity	Date
Begin Construction	June 2003
Startup and Test	September 2004
Commercial Operation	December 2004

The PPP will be accessed for construction from Duane Avenue. During construction, the project site will be used for temporary offices, parking, and outdoor material storage. There will be four off-site construction laydown and parking areas (see Section 2.2.19 below)

The peak workforce on the project during construction will be approximately 206, including construction craft personnel, and supervisory, support, and construction management personnel (see Section 8.10, Socioeconomics). Average workforce by month will be 114 over the 18 to 20 month construction period.

Construction will be scheduled between the hours of 6 a.m. and 6 p.m., Monday through Saturday. Additional hours may be necessary to complete critical construction activities. During the startup phase of the project, some activities will continue 24 hours per day, 7 days per week. Materials and equipment will be delivered by both truck and rail.

At the site, the peak construction workforce is expected to last from month 10 through month 12 of the construction period, with month 11 and 12 being the peak months (see Section 8.10, Socioeconomics, Table 8.10-8).

2.2.16 Power Plant Operation

There will be approximately 15 full-time employees working at the plant. The PPP plant will be operated by a staff consisting of 2 operators per 12-hour rotating shift (8 a.m. to 8 p.m.), with 2 relief operators; there will also be 3 supervisors/administrators and 2 maintenance technicians during the standard 8-hour workday. The facility will be designed to operate 7 days per week, 24 hours per day.

The PPP plant is expected to have an annual availability of approximately 94 to 96 percent. It will be possible for plant availability to exceed 96 percent for a given 12-month period.

- **Base Load**—The facility would be operated at maximum continuous output for as many hours per year as scheduled by load dispatch. During high ambient temperature periods or other high periods of high demand, duct firing may be used to increase the plant output at the desired load to meet increased SVP utility system demand.
- **Peak Load**—The facility can provide additional output by duct firing the HRSG and provide additional steam to the steam turbine.
- **Load Following**—The facility would be operated to meet variable SVP load requirements. The generation would be adjusted periodically to the load demand by lowering the output of the combustion turbines.
- **Partial Shutdown**—At certain times of any given day and any given year, it may be necessary to shut down one CTG/HRSG. This mode of operation could generally be expected during late evening and early morning hours, when system demand may be low.
- **Full Shutdown**—This would occur if forced by equipment malfunction, fuel supply interruption, or transmission line disconnect.

In the unlikely event of a situation that causes a longer-term cessation of operations, security of the facilities will be maintained on a 24-hour basis, and the CEC will be notified. Depending on the length of shutdown, a contingency plan for the temporary cessation of operations may be implemented. Such a contingency plan will be in conformance with all applicable LORS and the protection of public health, safety, and the environment. Depending on the expected duration of the shutdown, the plan may include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes will be disposed of according to applicable LORS. If the cessation of operations becomes permanent, decommissioning will be undertaken (see Section 4, Facility Closure).

2.2.17 Facility Safety Design

The PPP will be designed to maximize safe operation. Hazards that could affect the plant include earthquake, flood, and fire. Facility operators will be trained in safe operation, maintenance, and emergency response procedures to minimize the risk of personal injury and damage to the plant.

2.2.17.1 Natural Hazards

The principal natural hazards associated with the PPP site are earthquakes and floods. The site is located in Seismic Risk Zone 4. Structures will be designed to meet the seismic requirements of CCR Title 24 and the 1998 California Building Code (CBC). Section 8.4, Geologic Hazards and Resources, discusses the geological hazards of the area and site. This section includes a review of potential geologic hazards, seismic ground motions, and the potential for soil liquefaction due to ground shaking. Appendix 10 includes the structural seismic design criteria for the buildings and equipment.

The PPP site is essentially flat, with an average elevation of approximately 32 feet above mean sea level (MSL). The ground floor of plant facilities will be at 32 feet MSL. According to the Federal Emergency Management Agency (see Section 8.1.5), the site is not within the 100-year floodplain. Section 8.15, Water Resources, includes additional information on the potential for flooding.

2.2.17.2 Emergency Systems and Safety Precautions

This section discusses the fire protection systems, emergency medical services, and safety precautions to be used by project personnel. Section 8.10, Socioeconomics, includes additional information on area medical services, and Section 8.16, Worker Health and Safety, includes additional information on safety for workers. Appendix 10 contains the design practices and codes applicable to safety design for the project. Compliance with these requirements will minimize project effects on public and employee safety.

Fire Protection Systems

The project will rely on both on-site fire protection systems and local fire protection services.

On-Site Fire Protection Systems

The fire protection systems will be designed to protect personnel and limit property loss and plant downtime from fire or explosion. The project will have the following fire protection systems.

CO_2 Fire Protection System

This system will protect the turbine, generator, and accessory equipment compartments from fire. The system will have fire detection sensors in all compartments. Actuating one sensor will provide a high temperature alarm on the combustion turbine control panel. Actuating a second sensor will trip the combustion turbine, turn off ventilation, close ventilation openings, and automatically release the CO_2. The CO_2 will be discharged at a design concentration adequate to extinguish the fire.

Steam and Gas Turbines Lubrication Oil Skid Water Spray System

This system will provide suppression for the steam and gas turbines' lubrication oil skids.

Fire Hydrants/Hose Stations

This system will supplement the plant fire protection system. Water will be supplied from the plant underground fire water system.

Fire Extinguishers

The plant administrative building and other buildings will be equipped with portable fire extinguishers as required by the local fire department.

Local Fire Protection Services

In the event of a major fire, plant personnel will be able to call upon the City of Santa Clara Fire Department for assistance. The closest fire station to the PPP is City of Santa Clara Fire Station No. 2, approximately 1 mile away at 1900 Walsh Avenue, Santa Clara, CA 95050. The City of Santa Clara Fire Station No. 6, approximately 1.1 miles away at 3575 De La Cruz Boulevard, Santa Clara, CA 95051 is also in very close proximity to the PPP. The Hazardous Materials Risk Management Plan (see Section 8.5, Hazardous Materials Handling) for the plant will include all information necessary to permit all firefighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies.

Personnel Safety Program

The PPP will operate in compliance with federal and state occupational safety and health program requirements. Compliance with these programs will minimize project effects on employee safety. These programs are described in Section 8.16, Worker Health and Safety.

2.2.18 Facility Reliability

This section discusses the expected plant availability, equipment redundancy, fuel availability, water availability, and project quality control measures associated with the PPP.

2.2.18.1 Plant Availability

Due to the PPP's high predicted efficiency, it is anticipated that the facility will normally be dispatched based upon the existing economic conditions of the electrical power market. The facility will be designed to operate between 30 and 100 percent of baseload electrical output to support dispatch service in response to customers' demands for electricity.

The PPP will be designed for an operating life of 30 years. Reliability and availability projections are based on this operating life. Operation and maintenance (O&M) procedures will be consistent with industry standard practices to maintain the useful life status of plant components.

The combined-cycle power block (and the HRSG duct burners) will be permitted to operate for a total of 8,508 hours each year, consisting of 7,108 hours at base load and 1,400 at peak firing. Operating in this mode, PPP will generate 1,080 gigawatt hours of energy and burn 8,411,000 mmBtus of natural gas each year.

2.2.18.2 Redundancy of Critical Components

The following subsections identify equipment redundancy as it applies to project availability. Specifically, redundancy in the combined cycle power block and in the balance-of-plant systems that serve it are described. The combined cycle power block will be served by the following balance-of-plant systems: fuel supply system, DCIS, boiler feedwater system, condensate system, demineralized water system, power cycle makeup and storage, circulating water system, closed cycle cooling water system, and compressed air system. Major equipment redundancy is summarized in Table 2.2-2; redundancy following final design may differ.

Combined-Cycle Power Block

Two separate combustion turbine/HRSG power generation trains will operate in parallel within the combined-cycle power block. Each train will be powered by a combustion turbine. Each combustion turbine will provide approximately 32 to 39 percent of the total combined-cycle power block output. The heat input from the exhaust gas from each combustion turbine will be used in the steam generation system to produce steam. Heat input to each HRSG can be supplemented by firing the HRSG duct burners, which will increase steam flow from the HRSG. Thermal energy in the steam from the steam generation system will be converted to mechanical energy and then to electrical energy in the STG subsystem. The expanded steam from the steam turbine will be condensed and recycled to the feedwater system. Power from the STG subsystem will contribute approximately 22 to 36 percent of the total combined cycle power block output. The combined-cycle power block comprises the major components described below.

Table 2.2-2. Major equipment redundancy**.**

Description	Number	Note
Combined-cycle CTGs and HRSGs	Two trains	Steam turbine bypass system allows both CTG trains to operate at base load with the steam turbine out of service.
STG	One	See note above pertaining to CTGs and HRSGs.
HRSG feedwater pumps	Two - 100 percent per HRSG	
Condensate pumps	Three - 50 percent capacity	
Condenser	One	Condenser must be in operation for combined-cycle operation of CTGs in steam turbine bypass mode.
Circulating water pumps	Three - 50 percent capacity	
Cooling tower	One	Cooling tower is multi-cell mechanical draft design.
Closed cycle cooling water pumps	Two - 100 percent capacity	
Closed cycle cooling water heat exchangers	Two - 100 percent capacity	
Demineralizer—RO System	Two - 100 percent trains	Redundant installed pumps will be provided.
Natural Gas Compressors	Three - 50 percent	

CTG Subsystems

The combustion turbine subsystems will include the combustion turbine, inlet air filtration, chilling/heating system, water injection for NO_x, and Sprint system, generator and excitation systems, and turbine control and instrumentation. The combustion turbine will produce thermal energy through the combustion of natural gas; the thermal energy will be converted into mechanical energy through rotation of the combustion turbine, which drives the compressor and generator. Exhaust gas from the combustion turbine will be used to produce steam in the associated HRSG. The CTG generators will be air cooled. The generator excitation system will be a solid-state static system. Combustion turbine control and instrumentation (interfaced with the DCIS) will cover the turbine governing system, the protective system, and sequence logic.

HRSG Subsystems

The steam generation system will consist of the HRSG and blowdown systems. The HRSG system will provide for the transfer of heat from the exhaust gas of a combustion turbine and from the supplemental combustion of natural gas in the HRSG duct burner for the production of steam. This heat transfer will produce steam at the pressures and temperatures required by the steam turbine. The HRSG system will consist of ductwork, heat transfer sections, duct burners, SCR system, CO catalyst module, and include safety and auto relief valves and processing of continuous blowdown drains.

STG Subsystems

The steam turbine will convert the thermal energy to mechanical energy to drive the STG to make electrical energy in the generator. The basic subsystems will include the steam turbine and auxiliary systems, turbine lubrication oil system, and generator/exciter system. The steam turbine's generator will be a totally enclosed and water/air-cooled.

Distributed Control and Information System

The DCIS will be a redundant microprocessor-based system. It will provide the following control, monitoring, and alarm functions for plant systems and equipment:

- Control the HRSGs, STG, CTG, and other systems in response to unit load demands (coordinated control)
- Provide control room operator interface
- Monitor plant equipment and process parameters and provide this information to the plant operators in a meaningful format
- Provide visual and audible alarms for abnormal events based on field signals or software generated signals from plant systems, processes, or equipment

The DCIS will have a functionally distributed architecture comprising a group of similar redundant processing units; these units will be linked to a group of operator consoles and an engineer work station by redundant data highways. Each processor will be programmed to perform specific dedicated tasks for control information, data acquisition, annunciation, and historical purposes. Since they will be redundant, no single processor failure can cause or prevent a unit trip.

The DCIS will interface with the control systems furnished by the combustion turbine and steam turbine suppliers to provide remote control capabilities, as well as data acquisition, annunciation, and historical storage of turbine and generator operating information.

The system will be designed with sufficient redundancy to preclude a single device failure from significantly affecting overall plant control and operation. Consideration will be given to the action performed by the control and safety devices in the event of control circuit failure. Controls and controlled devices will move to the safest operating condition upon failure.

Plant operation will be controlled from the operator panel in the control room. The operator panel will consist of two or three individual CRT/keyboard consoles and one engineering workstation. Each CRT/keyboard console will be an independent electronic package so that failure of a single package does not disable more than one CRT/keyboard. The engineering workstation will allow the control system operator interface to be revised by authorized personnel.

Boiler Feedwater System

The boiler feedwater system will transfer feedwater from the LP economizer to the HP sections of the HRSGs. The system will consist of one pump each with 100 percent capacity for supplying each HRSG. Each pump will be multistage, horizontal, and motor-driven and will include regulating control valves, minimum flow recirculation control, and other associated pipes and valves. LP system will receivie feedwater directly from the LP economizer utilizing the pressure supplied by the condensate pumps.

Condensate System

The condensate system will provide a flow path from the condenser hotwell to the HRSG LP economizers. The condensate system will include three 50 percent capacity multistage, vertical, motor-driven condensate pumps.

Demineralized Water System

The demineralized water system will include fillers, 2 x 100% RO train and a DI water storage tank. The RO train will supply water to a final mixed-bed demineralizer trailer or portable pods. The DI water will be used for boiler makeup and CTG water injection.

Power Cycle Makeup and Storage

The power cycle makeup and storage subsystem provides demineralized water storage and pumping capabilities to supply high purity water for system cycle makeup, gas turbine water injection, and chemical cleaning operations. The major components of the system are 2 full-capacity, horizontal, centrifugal, cycle makeup water pumps.

Circulating Water System

The circulating water system provides cooling water to the condenser for condensing steam turbine exhaust and steam turbine bypass steam. In addition, the system supplies cooling water to the closed cooling water heat exchangers. Major components of this subsystem are three 50 percent, motor-driven, vertical pumps and associated pipes and valves, as required.

Closed Cooling Water System

The closed cooling water system transfers heat from various plant equipment heat exchangers to the circulating water system through the cooling water heat exchangers. Major components of this subsystem are two 100 percent, motor-driven, centrifugal pumps and two 100 percent cooling water heat exchangers.

Compressed Air System

The compressed air system will be designed to supply service and instrument air for the facility. Dry, oil-free instrument air will be provided for pneumatic operators and devices throughout the plant. Compressed service air will be provided to appropriate areas of the plant as utility stations consisting of a ball valve and quick disconnect fittings.

The instrument air system will be given demand priority over the service air system. A pressure control valve will be set at approximately 60 psi to cut off the air supply to the service air header once the system pressure falls below 60 psi.

Two 100 percent capacity oil free rotary screw package air compressors, water cooled, will supply compressed air to the service and instrument air systems.

2.2.18.3 Fuel Availability

Fuel will be delivered by PG&E from Line 132, located approximately 1.7 miles north of the PPP, through a tie-in and metering station located at Gianera Street and Wilcox Avenue (See Section 5). PG&E has confirmed that its system has sufficient capacity to supply the PPP from this location.

2.2.18.4 Water Availability

Cooling water and non-cooling process makeup water will be tertiary treated water from the South Bay Water Pollution Control Plant through the City of Santa Clara. The availability of water to meet the needs of the PPP is discussed in more detail in Section 7.0, Water Supply, and Section 8.15, Water Resources (see Appendix 7-A).

2.2.18.5 Project Quality Control

The objective of the PPP Quality Control Program will be to ensure that all systems and components have the appropriate quality measures applied during design, procurement, fabrication, construction, and operation. The goal of the Quality Control Program is to achieve the desired levels of safety, reliability, availability, operability, constructibility, and maintainability for the generation of electricity.

Assurance of the quality required for a system is obtained by applying appropriate controls to various activities. For example, the appropriate controls for design work are checking and review, and the appropriate controls for manufacturing and construction are inspection and testing. Appropriate controls will be applied to each of the various project activities.

Project Stages

For quality assurance planning purposes, project activities have been divided into the following nine stages:

1. **Conceptual Design Criteria—**Activities such as the definition of requirements and engineering analyses.
2. **Detail Design—**Activities such as the preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components.
3. **Procurement Specification Preparation—**Activities necessary to compile and document the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services.
4. **Manufacturer Control and Surveillance—**Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications.
5. **Manufacturer Data Review—**Activities required to review manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components and conformance to procurement specifications.
6. **Receipt Inspection—**Inspection and review of products upon delivery to the construction site.
7. **Construction/Installation—**Inspection and review of storage, installation, and cleaning and initial testing of systems or components at the plant site.
8. **System/Component Testing—**Actual controlled operation of power plant components in a system to ensure that the performance of systems and components conforms to specified requirements.
9. **Plant Operation—**Actual operation of the power plant system.

As the project progresses, the design, procurement, fabrication, erection, and checkout of each power plant system will progress through the nine stages defined above.

Quality Control Records

The following quality control records will be maintained for review and reference:

- Project instructions manual
- Design calculations

- Project design manual
- Quality assurance audit reports
- Conformance to construction records drawings
- Procurement specifications (contract issue and change orders)
- Purchase orders and change orders
- Project correspondence

For procured component purchase orders, a list of qualified suppliers and subcontractors will be developed. Before contracts are awarded, the subcontractors' capabilities will be evaluated. The evaluation will include consideration of suppliers' and subcontractors' personnel, production capability, past performance, and quality assurance program.

During construction, field activities will be accomplished during the last four stages of the project: receipt inspection, construction/installation, system/component testing, and plant operation. The construction contractor will be contractually responsible for performing the work in accordance with the quality requirements specified by contract.

The subcontractors' quality compliance will be surveyed through inspections, audits, and the administration of independent testing contracts.

A plant O&M program typical for a project of this size will be implemented to control O&M quality. A specific program for this project will be defined and implemented during initial plant startup.

2.2.19 Construction Laydown and Worker Parking Areas

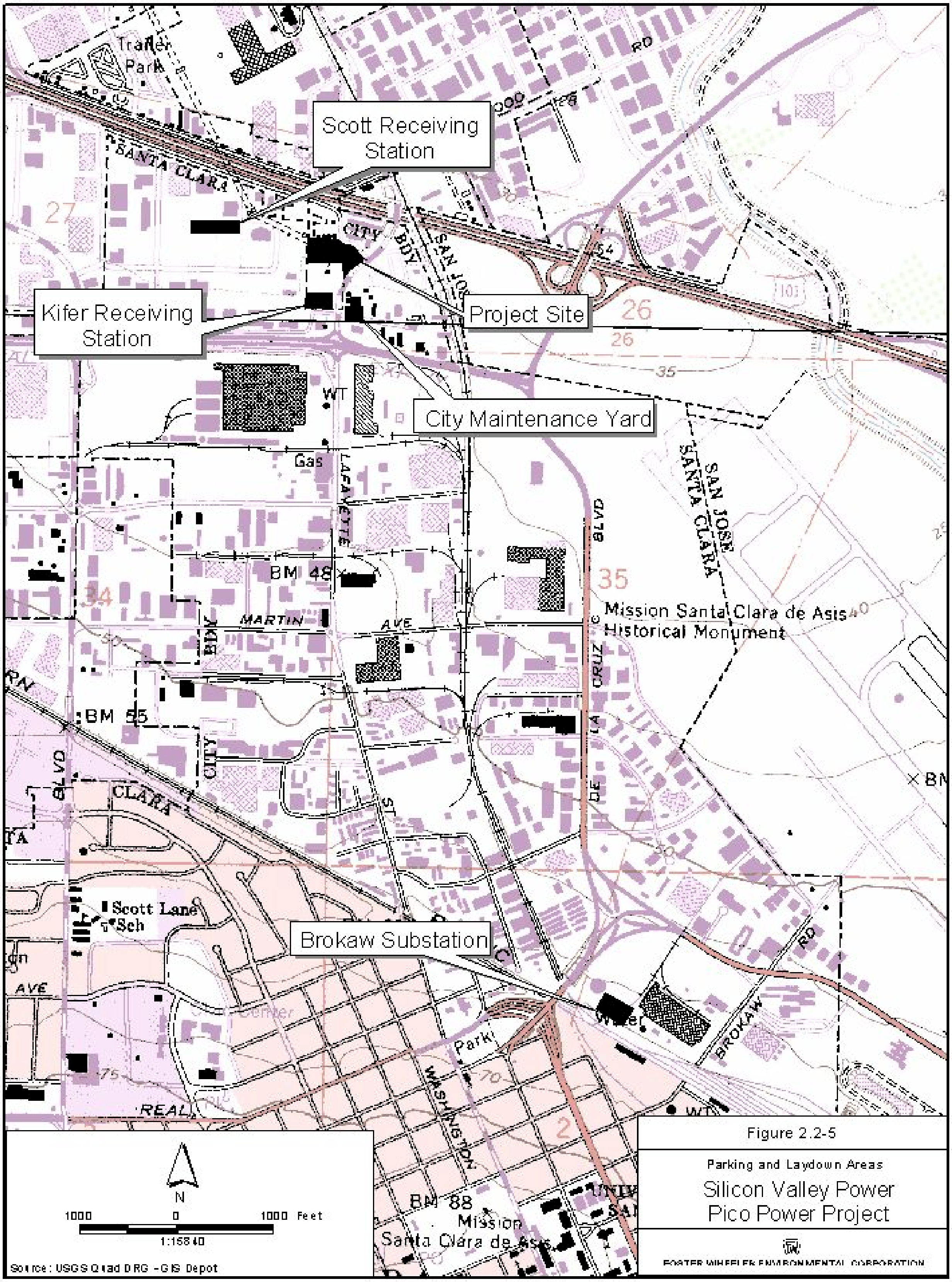
Four areas for construction laydown and off-site worker parking have been identified. These are:

1) The northern portion of the Scott Receiving station on Space Park Drive approximately 0.2 miles west of the PPP (0.4 acres). This area is entirely gravelled, chip-sealed, or paved.
2) The southern portion of the Kifer Receiving Station adjacent to and immediately south of the project site (1.5 acres), extending northward along the western receiving station fence and boundary. This area is entirely gravelled, chip-sealed, or paved.
3) Vacant space at the City of Santa Clara maintenance yard at the corner of Lafayette and Comstock streets (0.4 acres), approximately 400 feet southeast of the PPP site. This area is entirely paved.
4) A large, vacant lot south of and adjacent to the Silicon Valley Power Brokaw Substation, located west of Brokaw Road, south of Coleman, and east of the De La Cruz Boulevard overpass to the Union Pacific railroad tracks (1.9 acres). This area is entirely gravelled, chip-sealed, or paved.

The City of Santa Clara owns each of these areas. The location of the Scott, Kifer, and Lafayette properties is shown on Figure 2.2-1. Figure 2.2-5 shows the location all four construction laydown and worker parking areas.

2.3 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable laws, ordinances, regulations, and standards for each engineering discipline are included as part of Appendix 10.


Scott Receiving Station
Kifer Receiving Station
Project Site
City Maintenance Yard
Brokaw Substation
Mission Santa Clara de Asis Historical Monument
Figure 2.2-5
Parking and Laydown Areas
Silicon Valley Power
Pico Power Project
FOSTER WHEELER ENVIRONMENTAL CORPORATION
N
1000 0 1000 Feet
1:15840
Source: USGS Quad DRG - GIS Depot